Illuminating Engineering Society of North America

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Committee Correspondence Reply to

Matthew Hartley
Manager, Exterior Applications
Lithonia Lighting
1 Lithonia Way
Conyers, GA 30012

June 17, 2002

Mazi Shirakh / Gary Flamm
California Energy Commision
1516 Ninth Street
Sacramento, CA 95814-5512

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CALIF ENERGY COMMISSION

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Subject: California Outdoor Lighting Standards June 6, 2002.

Dear Mazi / Gary:

I am the current chair of the Outdoor Retail Sales Lighting sub-committee in the IESNA. The sub-committee reports to the Outdoor Environmental Lighting committee, as well as the Retail Sales committee of the IESNA. After reviewing the document, I have a few concerns over the proposed levels for automotive sales and retail canopy lighting. Your proposed levels are substantially lower than the current recommended practices. The levels proposed in the California Outdoor Lighting Standards derive from RP-33. This standard is a valid recommended practice, however it is not the most current recommended practice available. RP-33 was published in 1999, however the document reflecting the most current standards for outdoor retail sales lighting is in RP-2-01, *Recommended Practice for Lighting Retail Areas* published in 2001. RP-2-01 shows auto dealership levels ranging from 350-750 Lux for front row lighting, 200-500 Lux for general sales, and 50-100 Lux for ancillary areas. For retail canopy lighting the levels on the pumps are rated at 200-500 Lux and 50-150 Lux for all other areas. These levels take into account exterior lighting conditions, as well as retail sales competition. Since the lighting levels differ from those in RP-33 by a substantial margin, these levels need to reflect the most current standard available.

The sub-committee that I chair is currently working on a design guide for automotive retail sales. Since this is a work in progress, I cannot comment on levels or procedures that we are suggesting in the document. I have included a paper that Jim Eads and myself wrote and presented at the 1999 IESNA National Conference in New Orleans. This paper is the general basis for the design guide, and was one of the reasons the sub-committee was created.

I hope that these documents will help you in your review process of creating the California Outdoor Lighting Standards. If you have any questions, I would be happy to assist you. I would like to thank you for the opportunity to comment of the proposed document.

Best regards,

Matthew Hartley IESNA, LC
Chair, Automotive Retail Sales Lighting sub-committee

A Proposal for Automotive Retail Illuminance Guidelines

James K. Eads
Application Project Manager

Matthew J. Hartley BS, EIT, AIES
Application Project Manager

Lithonia Lighting
1 Lithonia Way
Conyers, GA 30012
800-279-8043

A Proposal for Automotive Retail Illuminance Guidelines

The purpose of this document is to establish illuminance guidelines for exterior automotive sales. No criteria for automotive sales lighting have previously been established. Interior merchandising and parking lot criteria have been long-standing with vague correlation to outdoor retail environments. Essential job tasks related to exterior automotive sales of reading sticker prices, as well as close inspection of all interior and exterior components of vehicles have not been addressed in any context. This document will provide a clear understanding of the procedures involved with selecting type and quantity for adequate lighting involved in various situations. These would include lot size, and surrounding lighting criteria using a matrix of values for each marketable area within the lot. Matters of safety and spill light are also addressed in this document.

Introduction:

For many years automotive retailers have longed for a proper design guide to assist them in producing quality lighting. Many of the lighting designers today produce light levels that are based purely on the idea that more light is better. This practice has gotten out of hand and must be addressed. With current issues of light trespass and excess spill light in regards to the environment, tighter criteria must be established for automotive sales lighting. Lighting equipment will also be discussed to aid in the reduction of glare and spill light. This paper will go through the different areas of concern in a sales lot as well as address issues of spill, glare, and color rendition. Considerations will still be given for various factors such as competition, location, and lot size in the determination of criteria.

Types of Automotive Sales Areas:

Automotive sales areas can be categorized in terms of their lot size. Although different dealers utilize different size lots for their automotive sales, three distinct categories can be identified. The number of parking stalls to be utilized for the sales of new or used vehicles categorizes these lots.

Greater than 800 Stalls- This would include large major dealer franchises and corporate used sales. These lots are considered high sales volume and have a steady flow of merchandise.

300-800 Stalls- This would include smaller major dealer franchises and large used car lots. These lots have considerable sales and have a steady flow of merchandise.

Less than 300 Stalls- These lots are typical of small dealerships, primarily used automobiles.

Four areas in each lot are of major concern.

Front row- The front row area displays the dealer's feature vehicles. This section is the first area that customers will see while driving by the establishment. Visual tasks include inspection of the vehicles and reading sticker prices. Both horizontal and vertical light levels need to be taken into consideration.

Sales Area- This area is used to sell the majority of the vehicles on the lot. Tasks include inspection of the vehicles and reading sticker prices. Designs of horizontal illumination have been proven to be satisfactory.

Customer Parking- Customer parking is used for customers to park their existing vehicles while they shop. Criteria for this area should be based primarily upon safety of vehicle and pedestrian traffic.

Preparation or Storage Area – This area is used to store vehicles prior to making them available for sale as well as vehicles waiting to be serviced. Criteria for this area should be based primarily upon safety of vehicle and pedestrian traffic.

Illuminance Considerations:

General. Lighting recommendations are given to provide an environment suitable for the merchandising of automobiles, while assuring safe movement for all forms of pedestrian and automotive traffic. Light levels also take into account many visual tasks required for inspection by all age groups. Deterrence of vandalism is an important factor to be considered in the design as well. The values in Table 1 specify separate average levels for different segments within each automotive dealership category. The values stated in Table 1 are recommended maintained horizontal illuminance at 36" above finished grade. The elevated calculation plane is used to simulate the level of the hood, and the average height of most vehicles in current production.

Table 1

Area		Illuminance Criteria for Automotive Sales Lighting (Average)											
		Front Row (Horizontal/Vertical) Surrounding Illuminance Levels			Sales Area (Horizontal) Surrounding Illuminance Levels			Customer Parking (Horizontal) Surrounding Illuminance Levels			Preparation/Storage Area (Horizontal) Surrounding Illuminance Levels		
Lot Size	Activity Level	Light	Medium	Dark	Light	Medium	Dark	Light	Medium	Dark	Light	Medium	Dark
>800	High	60/40	50/30	40/20	50	40	30	5	3	2	5	3	2
300-800	High	50/30	40/20	30/15	40	30	20	5	2.5	2	5	2.5	2
<300	Low	40/20	30/15	20/10	30	20	15	3	1.5	1	3	1.5	1

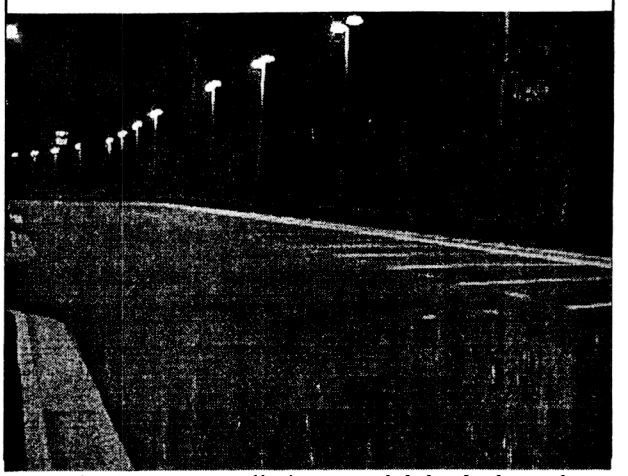
Lighting Quality:

Automotive sales lighting requires that other criteria be met besides illuminance. These metrics include color rendition, uniformity, glare, and light control. Sparkle from veiling reflections from the windshields of the vehicles provides a focus of sale as in jewelry stores. In merchandising, the most attractive products sell quickly.

Color rendition: Color rendition is the most important of lighting quality aspects. Having an adequate CRI from lamps in automotive sales is important. A minimum CRI rating of 70 is recommended. Inspection of the vehicle depends upon correct color rendition of the automobile. Flaws in the paint, body, and interior are inspected prior to sale, and are crucial to the customer. Inspection of the surroundings of the vehicle for leaks and leaking fluids are also important. It is recommended that only lamps with high CRI be used in automotive sales lighting. These include incandescent, fluorescent, and metal halide sources.

Uniformity: Different areas in a sales lot require different uniformity ratios. See Table 2. Uniformity for the front line is probably the most crucial. A maximum to minimum illuminance ratio of 3 to 1 is recommended in this area for horizontal illuminance. The general sales should have a maximum to minimum illuminance ratio of 5 to 1. This area is less critical than the front row, however uniformity is still an important issue. Customer parking and storage areas need to have a maximum to minimum illuminance ratio of no more than 12 to 1 for general-purpose lighting.

Figure 1- An example of good uniform lighting on the retail lot.



Uniformity is important to eliminate unsightly shadows that threaten to distort the perceived condition of the vehicle to the

Table 1

Area	Uniformity (Maximum to Minimum)
Front Row	3:1
Main Sale	
Prep / Sto	12:1
*Regardless of Activity Level	

customer. These include non-uniform painting, false leaks or the illusion of damaged

Glare: Glare control is important for the safety of drivers and pedestrians. Disability glare directed to drive lanes must strictly controlled. Driving conditions could be impaired by glare potentially resulting in accidents and damage to existing vehicles. Disability glare is defined by the IES as "The effect of stray light in the eye whereby visibility and visual performance are reduced." Discomfort glare must be considered as well. Discomfort glare is defined by the IES as "Glare producing discomfort. It does not interfere with visual performance or visibility." The negative impact of discomfort in a retail environment is well understood, however, and should be avoided.

Spill light: Environmentally responsible lighting practices must be observed in order to avoid excess spill light onto adjacent property or roadways. Automotive sales typically involve higher light levels than parking facility lighting. Spill light onto neighboring property may result in litigation, and spill light onto a roadway could produce discomfort or disability glare to passing motorists. These issues must be considered in the lighting design of automotive retail facilities.

Lighting Equipment:

General: Different fixture types can be used in automotive sales lighting. Only luminaries meeting IES cutoff criteria should be used. A secondary source (typically floodlights) are used to bring attention to a specific vehicle, or to bring up vertical levels in the front row. This practice is typically referred to as highlighting. Fixture selection depends on several factors:

1) Size and shape of the area.
2) Mounting height of the luminaries.
3) Location of poles and luminaries.
4) Illuminance requirements.
5) Quality of uniformity requirements (max-min).
6) Energy requirements (lamp wattage)
7) Code restrictions
8) Spill light criteria.

Area lighting luminaries: These fixtures are usually the primary source of lighting for automotive sales. They have a level of cutoff adequate for reducing glare and spill light. These fixtures include architectural luminaries, post top luminaries, and wall mounted fixtures for storage areas. For front row areas, cutoff luminaries are recommended to reduce spill light onto adjacent property. More leniency in terms of cutoff may be given to the fixtures illuminating the interior of the sales lot.

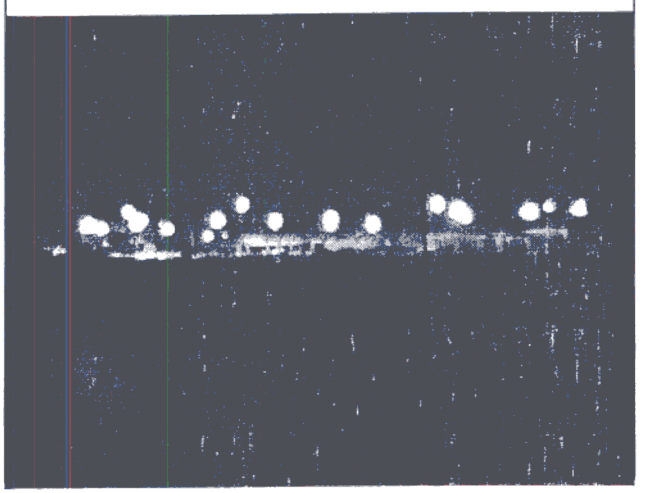


Figure 2- Floodlighting for an automotive sales lot as seen from a major highway using floodlighting.

Floodlighting: Floodlighting fixtures can be used on an automotive sales lot as a primary source if they have adequate shielding to prevent glare and spill light. They can also be used as a secondary source to bring up the vertical illuminance on the front line. These fixtures should be aimed into the sales lot and in some

cases have shielding. Aiming of these fixtures should be at a low angle from nadir as to not induce glare or excess spill light.

Special Lighting Considerations:

Security lighting: Lighting for security cameras can be a factor. Veiling reflections and proper illuminance levels should be observed. These areas are further discussed in the RP for Security Lighting.

Entrance Lighting: If the entrance to the automotive sales lot is located next to the front row, levels similar to the front row should be observed. Remote entrances should provide adequate lighting for a transition from the roadway to the interior of the lot.

Applications:

Proper illumination of an automotive retail site begins with the consideration of the expected competition levels for each lot. Three factors contributing to the competition level are *activity level, lot size, & direct competitor.*
The activity level for automotive merchandising refers to the traffic flow and visibility from nearby roads and intersections. There are three categories in conjunction with activity. These are high, normal or low activity regions. These activity levels reflect both traffic and pedestrian activity, but are not limited to the following examples:

High Activity – Locations that offer the greatest potential for visual exposure encourage impulse purchasing. These areas are often located near a highway, autoplex, or major intersections.

Low Activity – Locations in rural areas, sites that are remote from any main roadways or commercial zones.

According to the Lighting Handbook (8th Edition), surrounding environmental conditions should be considered in exterior lighting applications. The purpose of comparing surrounding conditions is to attract potential customers and achieve visual appeal. This is analogous to retail lighting with windowfronts. Differing surrounding environmental conditions can be separated into three categories: *light, medium, and dark.* Main retail districts will require considerably higher light levels than a smaller retail district. The purpose of this criterion is to sufficiently illuminate the sales area to attract attention while remaining consistent with the surroundings.

Larger lots inherently involve a higher level of on-site activity. As such, light levels must be adjusted to accommodate the varying activity levels. Various automotive dealerships of comparable size are founded in well-established commercial zones.
The proximity of competing dealerships effects the lighting of the current situation. Competing lots located in adjacent or extreme close proximity may warrant an increase in the next higher criteria level in order to meet competing lighting levels.

Conclusion:

The proceeding criteria are established as a guide that can be used as a baseline to improve current practices in exterior automotive lighting. Using these criteria tighter controls can be implemented to prevent environmental spill light without sacrificing the retail value of a well-illuminated facility. The method used here should be used as a design guide to facilitate consistent high quality lighting installations. Designs may wary due to extraneous circumstances

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3. Illuminating Engineering Society of North America. 1984. *Lighting for Parking Facilities RP-20.* New York: IESNA